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## Section 4 - Information Technology

### Overview

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This section lists equipment, software, and systems that provide information functionality and interoperability between local responders and other agencies working in cooperation to resolve or manage incidents. The items mentioned serve to develop situational awareness and better coordinate response operations for CBRNE terrorism and other 'all-hazard' homeland security operations.

Like the previous edition, the Spring 2007 SEL has divided information technology, cyber security and communications into three distinct sections (Sections 4, 5, and 6 respectively). While there continues to be a close connection among the three (and even some merging of technologies such as voice communications over the Internet and encryption of data), the separation of sections should make it easier to locate desired items. We have continued our efforts to provide information on desirable features, operating limitations, and standards (where applicable). The information provided is by no means exclusive. These fields are designed to enhance the reader's understanding of the defined items and their practical use.

### Changes for 2007

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As described in this year's SEL Introduction, the IAB has realigned the structure of the SEL to match the DHS Authorized Equipment List (AEL). This will enable the Responder Knowledge Base to present all users with the first integrated display of AEL and SEL information. Because DHS is required to manage and report grant expenditures in a specific set of categories, we have worked with them to move some items from the Information Technology (IT) section into areas that reflect their functional use. Items from the 2006 IT section such as Data Fusion, Signals Intelligence Investigative Software, and Facial Recognition Software have moved to a new Section 13, Terrorism Incident Prevention Equipment. Video Security Assessment Systems have been moved to Section 14, Physical Security Enhancement Equipment, while Fingerprint Processing Equipment is now part of Section 20, Intervention Equipment.

The IT section now includes Underwater Cameras (supporting a major initiative in Sections 1 and 3 to incorporate water operations), and Operational Area Personnel Tracking and Accountability Systems. Datasets for Geospatial Information Systems (GIS) were also included as a separate item, recognizing that they are being procured separately from the original systems. Other minor changes and updates are included throughout the section.

### Online Selection Factors

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Like many sections in the 2007 SEL, the online<sup>1</sup> version of the Information Technology Section uses a pair of selection factors to assist users in quickly identifying appropriate equipment items. For this section, the SubGroup chose User Level and Use Location (described below) as the two factors. Every online item is "tagged" for each appropriate combination of factors. Thus users of the online version can choose any combination of User Level and Use Location, and the system will provide a list of all items tagged for that combination.

<sup>1</sup> The online version is available on the Responder Knowledge Base, [www.rkb.mipt.org](http://www.rkb.mipt.org).

**The User Levels for information technology equipment are defined as follows:**

End User	Users who possess no special training or other qualifications with respect to the equipment being utilized. Examples would be personal computer users who are familiar with basic applications but have not received any classroom or advanced training.
IT Technician	Users who possess some specialized training or other qualifications with respect to the equipment being utilized. Examples would be users who have attended classroom training for a Geographic Information System (GIS), or who have received training in hardware installation and setup.
IT Advanced Technician	Users who possess some extensive training or career-level qualifications with respect to the equipment being utilized. Examples would be trained professional network administrators who possess professional qualifications such as MCSE, or computer repair professionals.

**The probable Use Location(s) are defined as follows:**

Rear Information Zone - Strategic	Emergency Operations Center/ Joint Operations Center Intel Support.
Rear Information Zone - Operational	Emergency Operations Center/ Departmental Operations Center Intel Support.
Forward Information Zone - Support [Cold]	Incident Command Post Intel Support; near incident scene, but in cold zone.
Forward Information Zone - Contamination Reduction [Warm]	Operations/Intel Support in warm zone.
Forward Information Zone - Exclusion [Hot]	Operations/Intel Support in hot zone.

The factors described above provide a method for classifying equipment items. For example, a network router might be classified as requiring an IT Advanced Technician to install and configure, and might be used in the Rear Information Zone or the Forward Information Zone - Support [Cold], but would probably not be used in either the Warm or Hot Zone. In the online SEL, if a user selected “IT Advanced Technician” and “Forward Information Zone - Support (Cold)” as the two desired selection factor values, the network router item would appear in the search results along with any other equipment recommended for that combination.

## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>01 - Computer Aided Dispatch</b>				
04AP-01-CADS*	Computer software system(s) used to track and manage public safety incidents and resources.	----- Subcomponents optimally should include global positioning, space visualization, automated vehicle location, alerting systems, and interface with ANI/ALI (Automatic Number Identification / Automatic Location Identification) databases. See also 04AP-08-SVIS, 04AP-02-ALRT, 04AP-04-GISS, 04AP-03-AVLS.		
<b>AP - Application Systems and Software</b>				
<b>02 - Position Locating Systems</b>				
04AP-02-AVLS*	Automatic Vehicle Locating (AVL) Systems  Systems, Automatic Vehicle Locating (AVL)	Both GPS (differential correction) and DR (ded reckoning) capability. Inclusion of DR preferred.  Procure as package to ensure compatibility. There are several Coordinate Systems and Datum/Projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate Systems may include: Lat/Long, State Plane, UTM, etc. Datum/Projections may include: NAD 27, NAD 83, WGS 84, etc.		
04AP-02-DGPS*	Device, Global Positioning System (GPS).	Differential GPS (DGPS) compatible. Wide Area Augmentation System (WAAS) compatible.  Required unobstructed line of sight to satellites (not used indoors or underground). There are several Coordinate Systems and Datum/Projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system AND projection. Coordinate Systems may include: Lat/Long, State Plane, UTM, etc. Datum/Projections may include: NAD 27, NAD 83, WGS 84, etc.		
04AP-02-OAPT*	Operations area personnel tracking and accountability systems.  System, Operations	----- Training may be required for operators. →		

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>02 - Position Locating Systems - Continued</b>				
Area Personnel Tracking and Accountability				
04AP-02-PLTI*		Precision Locating Tracking Systems (PLT), indoor capable.	2-D versus 3-D. ----- Emerging technology. Range/penetration, ease of set-up.	
<b>AP - Application Systems and Software</b>				
<b>03 - Geographical Information Systems (GIS)</b>				
04AP-03-GISD		Data related to positions on the Earth's surface in the form of databases, maps, satellite and other remote-sensing imagery. For use with Geospatial Information Systems (Item 04AP-04-GISS).	----- Consider currency of data in operational Geospatial Information Systems, particularly those including street names. There are several coordinate systems and datum/projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate systems may include: Lat/Long, State Plane, UTM, etc. Datum/projections may include: NAD 27, NAD 83, WGS 84, etc.	
	Data, Geospatial			
04AP-03-GISS*		Geospatial/Geographical Information Systems (GIS), including application software as well as integrated hardware for implementation. GIS systems support the acquisition, integration and dissemination of geospatial data and	Emerging technology - standards and functionality for GIS software are still being developed. Capable of updating database as maps and terrain features change by installing new data set. See 04AP-04-GISS. ----- Geospatial software should support vector, raster, CAD, and/or spatial file formats. There are several coordinate systems and datum/projections - it is critical that all involved systems (GIS, mapping, GPS receivers, etc.) are utilizing the same system and projection. Coordinate systems may include: Lat/Long, State Plane, UTM, etc. Datum/projections may include: NAD 27, NAD 83, WGS 84, etc. →	

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
AP - Application Systems and Software 03 - Geographical Information Systems (GIS) - <i>Continued</i>	<p>imagery. GIS systems provide or support multiple CBRNE terrorism prevention and response functions, including (but not limited to):</p> <ul style="list-style-type: none"> <li>- Geospatial Analysis - allows for association of intelligence and location-based information to perform complex analysis and visualization</li> <li>- Decision Support - provides a mechanism to deliver actionable intelligence, supporting strategic and tactical operations</li> <li>- Situational Awareness - supports a common operational picture with near real-time intelligence fused with geospatial information fully describing the area of operations in a spatial context</li> <li>- Navigation</li> <li>- Monitoring (tracking, weather, traffic, assets, environment, damage</li> </ul>		

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Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<p><b>AP - Application Systems and Software</b> 03 - Geographical Information Systems (GIS)</p>	<p>assessments, disease surveillance) - Modeling - combines complex spatial information and applies modeling tools to predict consequences of events in support of planning, mitigation, response and recovery - Mapping - presents fused information in a standard, distributable and easily recognizable format - Reporting (activity, after-action, alert-warning, location, situation, coverage portrayal)</p>		
<p><b>AP - Application Systems and Software</b> 04 - Risk Management Software</p>	<p>04AP-04-RISK* Software, Risk Management</p>	<p>Software or systems that facilitate capture, quantification, and management of risk factors involved in specific tasks or programs.</p>	<p>Should incorporate some form of data visualization capability. Must provide parameters to allow adjustment of weighting factors for risk components. ----- Look for maximum flexibility in defining risk components and weighting that reflect your own requirements in addition to the option of using predefined formulas.</p>

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>AP - Application Systems and Software</b>				
<b>05 - Incident Management</b>				
04AP-05-CDSS*	Software, ICS	Incident Command System (ICS) software including command/plans and decision-support tools.	----- Emerging technology - standards and functionality are still being developed.	
04AP-05-CRED*	System, Credentialing	Software application and associated hardware and material for creating site/event credential badges and controlling scene access.	----- Additional equipment needs may include: digital cameras, laminating equipment, facial recognition software, etc. Also consider mobile/portable versus server-based/attached systems.	95
04AP-05-SVIS*	Software, Operational Space Visualization	Operational space visualization tools.	Mapping. Graphical display of data. Ability to draw from multiple data sources. Data mining. ----- Emerging technology - standards and functionality are still being developed.	
<b>AP - Application Systems and Software</b>				
<b>06 - Analytical Tools</b>				
04AP-06-CBRN*	Software, CBRNE/Commercial Chemical/Hazard	CBRNE/commercial chemical/hazard software and response system.	----- Emerging technology - standards and functionality are still being developed.	

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**Section 4 | Information Technology**

<b>Item Number/Title</b>		<b>Description</b>	<b>Features/Operating Considerations</b>	<b>Standards<sup>1</sup></b>
<b>AP - Application Systems and Software</b>				
<b>06 - Analytical Tools - Continued</b>				
04AP-06-PMOD*	Software, Plume Modeling	Plume modeling fate and transport software and/or databases capable of real-time linkage to sensors and meteorological monitoring and detection.	----- Emerging technology - standards and functionality are still being developed. There are lot of vendors/researchers offering many differing models of varying quality, many of which are unproven!	
04AP-06-TRAF*	Software, Traffic Modeling	Software designed to depict traffic flow, identify congestion points, and predict impact of accidents or deliberate alterations of traffic patterns such as alterations of signal times, detours, closures, etc.	Must be highly parameterized to allow accurate modeling of specific areas. Should be GIS based for interoperability and detail.  ----- Check ease of use, particularly ease of changing key parameters. If your organization already has GIS software, check for compatibility.	
<b>AP - Application Systems and Software</b>				
<b>07 - Inventory</b>				
04AP-07-INVN*	Software, Equipment Tracking and Inventory	Application software for tracking of tangible equipment, including location and person(s)/organization(s) responsible.	----- Consider interoperability (or at least data compatibility) with related systems such as Automated Vehicle Locator Systems (AVLS).	

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
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AP - Application Systems and Software			
08 - Simulation			
04AP-08-SIMS*	Systems that provide interactive audio-visual simulation of operational situations to support training, planning, or decision making.	Generally computer-based. May require additional projection equipment or a dedicated facility. ----- Need sufficient customization capability to accurately portray mission situations, preferably in the same geographic area. If equipment or weapons are included in the simulation, make sure that they have identical operational characteristics to the real equipment so that participants do not develop habits in the simulator that are detrimental to real-world performance.	
<b>HW - Hardware</b>			
01 - Computers			
04HW-01-DTOP*	Desktop computer, basic.	“>” indicates minimum requirement > Video Graphics Adapter (XVGA) > 16-bit audio > 32MB video memory > 2GHz processor DVD-R / CDRW > 56k modem Network Interface Card (NIC) 10/100 > 80GB hard drive > 4 USB 2.0 ports > 1GB of RAM	
04HW-01-HHCD	Handheld computing devices with connectivity. Includes a variety of platforms such as PDAs and Windows compatible devices.	Variety of operating systems available, including Windows CE, Windows PocketPC, Palm OS, Linux, etc. Wireless interface - 802.11x, Bluetooth, or other. ----- Match mission requirements to OS capabilities and compatibilities. Consider battery life and replacement battery availability. →	

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Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b>				
01 - Computers - <i>Continued</i>				

04HW-01-MOBL Computer, Mobile Data	Mobile computer devices, usually mounted permanently in vehicle, operating from DC power supply. Used for data upload and download, as well as local data entry.	<p>Ruggedization, sleeves may offer this capability.</p> <p>Ruggedized (shock, vibration, temperature, humidity, etc.). Ergonomically suited for in-vehicle operation. Touch screen - capacitive versus resistive.</p> <p>-----</p> <p>Connectivity, power supply.</p> <p>Consider possibility of using broadband connection for Voice Over Internet Protocol (VOIP) backup communication.</p>	
04HW-01-NTBK Computer, Portable	Basic notebook or tablet computer.	<p>“&gt;” indicates minimum requirement</p> <ul style="list-style-type: none"> <li>&gt; Video Graphics Adapter (XVGA)</li> <li>&gt; 16-bit audio</li> <li>&gt; 32MB video memory</li> <li>&gt; 1.5GHz processor</li> <li>DVD/CD RW</li> <li>&gt; 56k modem</li> </ul> <p>Network Interface Connection (NIC) 10/100</p> <ul style="list-style-type: none"> <li>&gt; 40GB hard drive (removable)</li> <li>PC MCIA slot</li> <li>&gt; 512MB RAM</li> <li>&gt; 2 USB ports 2.0</li> </ul> <p>-----</p> <p>Comparable processor speeds may be lower if Pentium® M chips are used in the machine. Ruggedization.</p>	
04HW-01-SRVR Computer, Server	Computer used as central host to provide connectivity or data to other	<p>Server operating system, often a Unix variant (Solaris, HP-UX, AIX), Linux, Mac OS X Server, Windows 2000 Server, or Windows Server 2003.</p> <p>Look for a minimum of 1GB of memory, 2GB or more preferred. →</p>	

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b> 01 - Computers - <i>Continued</i>		systems.	----- Consider fault tolerance in design, such as dual power supplies, dual fans, disk arrays (such as RAID 5 arrays) in which striping and mirroring can be used to create efficient, redundant storage. Additional fault tolerance features include error-correcting memory, and multiple processor architecture in which processing continues in a degraded mode after failure of single processor.  Servers with all of the above features can be extremely expensive. Alternatively, multiple identical servers can be procured and configured as a cluster to provide a desired combination of processing enhancement and redundancy.	
<b>HW - Hardware</b> 02 - Peripherals				
04HW-02-ALL1 All-in-One	Printer/Copier/Fax/Scanner in single device with either inkjet or laser printing capability.	Minimum 600 DPI, high quality would be 1200 DPI. USB connectivity desirable. Network compatibility desirable. ----- Consumable supplies may be critical, particularly for ink-jet devices. Correct toner cartridges critical for laser devices. Consider types of fax traffic (e.g., images) before deciding on print quality requirement. Consider cost of consumables.		
04HW-02-BARC Equipment, Bar Code Reading and Printing	Bar code readers and printers, including devices that have wireless network capabilities.	Tag and readers. ----- Ensure compatibility of bar code types.		

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Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
04HW-02-PLOT Plotter	Output device for producing oversize hard-copy output such as maps and visualization graphics.	<p>Minimum 600 DPI, high quality would be 1200 DPI. B/W or color. Large format. USB connectivity desirable. Network compatibility desirable.</p> <p>-----</p> <p>Consumables (ink supplies) can be critical and quickly consumed when printing high resolution full-page color. Consider types of output (e.g., images) before deciding on print quality requirement. Consider cost of consumables.</p>	
04HW-02-PRNT Printer	Printer using laser or ink-jet technology.	<p>Minimum 600 DPI, high quality would be 1200 DPI. B/W or color. USB connectivity desirable. Network compatibility desirable.</p> <p>-----</p> <p>Consumables (toner and ink supplies) can be critical, and quickly consumed when printing high resolution full-page color. Consider types of output (e.g., images) before deciding on print quality requirement. Consider cost of consumables.</p>	
04HW-02-RFID Devices, Radio Frequency Identification	Radio Frequency Identification Devices (RFID) and associated readers.	<p>Passive and/or active. Tag and readers.</p> <p>-----</p> <p>Distance sensitive.</p>	
04HW-02-SCAN Scanner	Scanner, flatbed or portable.	<p>USB connection capability desirable. Network compatibility desirable.</p> <p>----- →</p>	

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## Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b> 02 - Peripherals - <i>Continued</i>				
04HW-02-STOR*	Storage, Portable External	Devices that function as virtual drives for storage and transfer of files. Includes USB memory sticks, flash drives, smart chips, etc.	May want RF capability in contaminated zones, perhaps via connection to handheld device.  Minimum 256MB storage. Drive emulation. Compatibility with digital cameras. USB 2.0 compatibility. ----- Check driver requirements. Some devices may fit cameras but require a reader to interface with PC. Security (device access and content).	
<b>HW - Hardware</b> 03 - Networking Components				
04HW-03-ROUT	Router	Network device that connects two or more networks or computers, providing appropriate addressing and packet handling.	Wide variance in size, capacity, and price. May provide Dynamic Host Configuration Protocol (DHCP) service to provide IP addresses on demand to network hosts. May also function as a switch (see 04HW-03-SWCH) or as a Wireless Access Point (WAP - see 04HW-03-WAP for special issues regarding wireless operation). May have built-in firewall capabilities (see 05NP-00-FWAL for details on firewalls). ----- Since routers provide a path between networks, proper configuration and security implementation is essential. Low-end routers are often used as an access point for DSL or Cable-Modem connections to the Internet. Highly recommend that routers be able to support 10/100Mbps Ethernet operation. If very high bandwidth is required, routers with 10/100/1000 capability should be considered.	99, 100, 137
04HW-03-SSRV	Server, Serial	Device that provides a network (TCP/IP) presence for serial devices.	----- Should offer Dynamic Host Configuration Protocol (DHCP) capability as well as the ability to operate at a static IP address. →	

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Section 4 | Information Technology

Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b>				
<b>03 - Networking Components - Continued</b>				
		Example: printer network adapter.		
04HW-03-SWCH	Switch, Network	Network switching device.	Wide variance in size, capacity, and price. ----- Smaller switches now used in place of hubs, providing better performance.	
04HW-03-WAP	Access Point, Wireless	Wireless Access Point (WAP) for local area networking under 802.11x.	802.11b provides widest compatibility; 802.11g provides improved speed. May be combined with router/switch capability (see 04HW-03-ROUT for details on routers).  NOTE: The newest standard, 802.11n, has not yet been finalized, and users should be extremely cautious about purchasing “pre-n” products until the standard has stabilized and its compatibility with earlier standards is established. ----- Recommend the following minimum settings (in priority order): 1) Enable strongest available encryption. WPA and WPA2 are preferred, use WEP if they are not available. WEP is more vulnerable to attacks, but still far superior to no encryption at all. 2) Disable Service Set Identifier (SSID) broadcasting. It is not essential and advertises the existence of the WAP to unauthorized users. 3) Restrict access to the wireless network to specific hosts by MAC address (a special identifier unique to each network access card). 4) Rotate (change) the network encryption key on a regular basis. Recommend monthly.	99, 100, 137
<b>HW - Hardware</b>				
<b>04 - Miscellaneous Adapter Cables/Connections</b>				
04HW-04-CABL		Miscellaneous adapter cables/connectors.	→	

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## Section 4 | Information Technology

Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>HW - Hardware</b>			
04 - Miscellaneous Adapter Cables/Connections			
Adapter Cables/ Connectors			
<b>MD - Media Devices</b>			
01 - Cameras and Surveillance Equipment			
04MD-01-CMRA  Camera, Still	Still camera, digital or film.	Decontaminable/disposable. Intrinsicly safe housing. ----- Consider consumables (film cameras) and battery life and memory capacity/medium (digital cameras). Digital images may have legal implications - evidentiary standards for digital imagery are still emerging.	
04MD-01-IRED  Camera, Infrared (IR)	Infrared (IR) a. Thermal b. Forward Looking Infrared Radiation (FLIR), and/or c. Infrared detection	Decontaminable/disposable. Intrinsicly safe housing. ----- Note calibration requirements and potential cost.	
04MD-01-IRIL  Equipment, Illumination, IR	Infrared illumination equipment.	Decontaminable/disposable. Intrinsicly safe housing. ----- Used as a supplement to IR camera and/or detection equipment.	
04MD-01-LAMP*  Equipment, Light Amplification	Light amplification (night vision enhancement) equipment, including hand-held, helmet	Decontaminable/disposable. Intrinsicly safe housing. Interchangeability between hand-held and mounted use is desirable. Visible or infrared, depending upon system. →	

<sup>1</sup> Use numbers given to refer to Standards List at the end of this document.

\* Item has been moved or changed in the edition.

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>MD - Media Devices</b>				
<b>01 - Camera and Surveillance Equipment - Continued</b>				
		mounted, or equipment-mounted tactical systems. Includes hardware/accessories necessary for helmet/equipment mounting.	----- Consider battery type and availability. Consider compatibility with PPE.	
04MD-01-UCAM*	Camera, Underwater (Still/Video)	Still or video camera adapted or designed for use underwater.	Housings to accommodate film or digital memory. Handheld, tethered, and remote configurations. Optional strobe attachments. ----- Consider depth limitations. Consider lighting requirements, including possible use of infrared. Consider power/battery life, including temperature impact on batteries. Consider type and availability of batteries.	
04MD-01-VCAM	Camera, Video	Video camera.	Intrinsically safe housing. Remote operation, including pan, tilt, zoom. ----- Water-resistant housing accessory desirable for hot-zone operations. Decontamination/disposable potential.	
<b>MD - Media Devices</b>				
<b>02 - Projectors</b>				
04MD-02-PROJ	Projector, Video	Video projector.	XVGA (1024x768) or greater projection capability highly desirable. Remote operation via USB connection desirable. Composite TV signal compatibility desirable. ----- Check lumen and contrast ratings, particularly if operation will be in areas of high →	

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>MD - Media Devices</b>				
<i>02 - Projectors - Continued</i>				
			ambient lighting. Check bulb life rating and bulb replacement cost. Operation in high heat environment can impact bulb life.	
<b>MD - Media Devices</b>				
<i>03 - Displays</i>				
04MD-03-DISP	Display, Video	Video display - assorted technologies including CRT, Plasma, LCD, etc.	----- Plasma screens are subject to image 'burn-in' and may not be advisable for some applications. Emerging technology - standards and functionality are still being developed.	
<b>SN - Sensor Devices</b>				
<i>01 - Remote Sensors</i>				
04SN-01-PTMS	Station, Portable Meteorological	Portable meteorological station that monitors (at a minimum) temperature, wind speed, wind direction, precipitation, and barometric pressure.	----- Considerations: telemetry, greatly affected by placement (micro climates in downtown cores, in buildings, etc.).	
04SN-01-XMIT	Transmission Device, Wireless, Remote Sensor	A device which, when attached to a remote sensor such as a video camera or chemical detector, allows wireless transmission of data to a distant base. May use radio frequency (RF) or infrared (IR) transmission.	----- Compatibility with multiple sensor devices desirable. ----- Carefully check effective distance and sensitivity to obstacles and weather. May require line-of-sight. Check effective data rates in marginal conditions, especially if used for live video.	

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SW - System and Networking Software</b>				
<b>01 - Operating Systems</b>				
04SW-01-OSSS System, Server Operating	Operating systems for servers. Examples include Windows, Mac OS X Server, Unix, Linux.	Minimum version should be: Windows: 2000 or 2003 Apple: Mac OS X Server Linux: Varies by distribution - latest kernel version is 2.6.x Unix: Varies with brand - check with vendor for current release ----- Check provided browser for 128-bit encryption and SSL capability.		
04SW-01-OSSW System, Workstation Operating	Operating systems for workstations. Examples include Windows, Mac OS X, Unix, Linux.	Minimum versions should be: Windows: 2000 or XP Apple: Mac OS X Linux: Varies by distribution - latest kernel version is 2.6.x Unix: Varies with brand - check with vendor for current release ----- Check provided browser for 128-bit encryption and SSL capability.		
<b>SW - System and Networking Software</b>				
<b>02 - Application Programs</b>				
04SW-02-EMLC Software, E-mail Client	E-mail client software.	May be integrated into office suite. ----- See NIST SP 800-45 for security guidance.		134
04SW-02-EMLS Software, E-mail Server	E-mail server software.	----- Need to control relay of outbound mail to prevent server from being used as a spam platform.		134

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Item Number/Title		Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SW - System and Networking Software</b> 02 - Application Programs - <i>Continued</i>				
04SW-02-IMSG	Software, Instant Messaging	Instant messaging (IM) software.	Logging capability desirable. Enterprise-level systems with encryption are recommended.	
04SW-02-VCSW	Software, Video Teleconferencing	Video teleconferencing software.	Up to 4 participants. ----- Encryption desirable.	
<b>SW - System and Networking Software</b> 03 - Suites				
04SW-03-OFFC	Software, Office Software Suite	Office software suite (spreadsheet, database, word processing and graphics presentation).	----- Document interoperability is critical when moving between suites.	
<b>SW - System and Networking Software</b> 04 - Network Operating and Monitoring Systems				
04SW-04-NETW	Software, Network	Software for networking, monitoring network performance and/or maintaining configuration.	----- Trained personnel required for installation and operation.	
<b>SW - System and Networking Software</b> 05 - Monitoring Software				
04SW-05-SCAD	A software/hardware system designed primarily	Remote monitoring and operation of large numbers of devices. Pre-set control functions such as duty cycling of equipment, or automatic device →		

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Item Number/Title	Description	Features/Operating Considerations	Standards <sup>1</sup>
<b>SW - System and Networking Software</b> 05 - Monitoring Software - <i>Continued</i>	System, SCADA (Supervisory Control and Data Acquisition) to monitor and control remote sensors and actuators. Uses vary from large-scale examples such as refinery or power grid control to building HVAC systems.	activation or alarms based upon sensor inputs exceeding set limits. ----- Type(s) of communication between remote points and central controller(s), and susceptibility to interference. Architectural structure may involve only a single controller with direct access to all points, or a hierarchical structure with intermediate controllers able to perform some functions autonomously.	

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